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ABSTRACT

The primary objective of this study was to describe those mental processes in which teachers engage while making preactive planning decisions. This objective was approached by means of a detailed descriptive case study of one elementary teacher's planning decisions for a five-month period. The study was designed to address a need for descriptions and theoretical models of planning processes and to examine the usefulness of certain decision-modeling methods for describing complex decisions made in field settings. Both ethnographic and information-processing approaches were used to describe distinctive features of the teacher's planning technology and to develop two models of teacher planning. The structural model identifies five levels of planning used by this teacher and describes the goals, cues, form, and effectiveness criteria used at each level. The process model represents decision processes differing from the goals-alternatives-choice sequence of the linear planning model. Problem finding, problem formulation, and a design process involving cycles of plan elaboration and mental "trying out" are presented as major planning processes. (Author/DS)

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Research Series No. 18

# A STUDY OF TEACHER PLANNING: DESCRIPTION AND A MODEL OF PREACTIVE DECISION MAKING

Robert J. Yinger

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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Abstract

One elementary teacher's planning decisions were studied during five months of classroom instruction. Both ethnographic and information-processing approaches were used to describe distinctive features of the teacher's planning "technology" and to develop two models of teacher planning. The structural model identifies five levels of planning used by this teacher and describes the goals, cues, form, and effectiveness criteria used at each level. The process model represents decision processes differing from the goals-alternatives-choice sequence of the linear planning model. Problem finding, problem formulation, and a design process involving cycles of plan elaboration and mental "trying out" are presented as major planning processes.

# A Study of Teacher Planning: Description and a Model of Preactive Decision Making[1]

Robert J. Yinger[2]

## Introduction

Much of the research on teaching in the last 20 years has been aimed at identifying those teaching behaviors that are related to teaching effectiveness. The results of these efforts have been somewhat disappointing in that few teaching behaviors have been noted which strongly and consistently relate to student achievement or student attitudes.

A general characteristic of most teaching behavior studies is their focus on behavior that occurs when students are in the classroom. Jackson (1965) has referred to these face-to-face encounters between teacher and students as "interactive" teaching and has differentiated them from "preactive" teaching. Preactive teaching takes place before and after school, during recess, and at other times when the teacher is alone in the classroom. "Empty classroom" behavior may include such things as preparing lesson plans, marking papers, setting up equipment, making and running dittos, thinking about how to deal with certain behavior or learning problems, and so forth. Although the distinction between preactive and interactive teaching has been popular for many years, few studies have examined the "empty classroom" aspect of teaching.

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[1]This paper is a summary of a doctoral dissertation "A Study of Teacher Planning: Description and Theory Development Using Ethnographic and Information Processing Models."

[2]Robert J. Yinger, a former research intern at the Institute for Research on Teaching, is an assistant professor in the College of Education at the University of Cincinnati.

Teacher as Decision Maker

Recently, it has become popular to characterize teachers as problem solvers and decision makers (Shulman & Elstein, 1975; Lanier & Shulman, Note 1). Indeed, many educational researchers have contended that the most important teaching skill is decision making (e.g., Shavelson, 1973) and that "in teaching it's the thought that counts."[3] One consequence of this view is the temptation to portray the teacher as a rational information processor who is continually making diagnoses, testing hypotheses, and making decisions. It is much more likely that this conceptualizaton of teaching more accurately describes some moments of teaching than others. Although there may be some advantage to using logical and rational models to describe the teacher's in-class activities, opportunities for this type of behavior during interactive teaching may be few and far between. The rapidity and immediacy of the teacher's interaction with pupils in the classroom often precludes the rational-purposeful kind of thinking that is normally associated with problem solving and decision making.

To understand teaching as a purposeful, reflective activity, it is necessary to look at those times when thoughtful behavior is most likely to occur. The preactive phase of teaching is one time when the description of the teacher as problem solver and decision maker may be most accurate.

There are many different things that teachers do in the preactive phase of teaching, but planning is probably one of the most important. It would be rare for a teacher and classroom to function effectively without some kind of teacher planning. The wealth and variety of instructional materials

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[3]This quote has been attributed to Dr. Perry Lanier and has become the informal motto of the Institute for Research on Teaching.

available, the emphasis on meeting school or district objectives, and the wide range of student aptitudes in most classrooms are but a few of the factors that virtually necessitate thinking and planning for the term, coming weeks, or even the next day.

The importance of teacher planning has been further emphasized in recent ecological studies of the classroom (Kounin, 1970; Gump, 1969; Doyle, 1977, Note 2). In a study of beginning teachers, Doyle (Note 2) found that the most salient characteristics of the classroom environment for those teachers were: (1) multidimensionality, (2) simultaneity, and (3) unpredictability. Doyle explained that classrooms are multidimensional in that they serve a variety of purposes, not all of which are compatible. Classrooms are simultaneous in that significant events often occur at the same time rather than following each other in serial fashion. Unpredictability refers to the degree to which the complexity of ebb and flow in classroom eventes prevents the teacher from accurately predicting the outcome of a planned activity. By adding to these characteristics those of urgency and spontaneity -- or "immediacy", as Jackson (1968) refers to it -- the teaching environment is pictured as dominated by two features: complexity and unpredictability.

In addition to characterizing the teaching environment, ecological psychology acknowledges and emphasizes the subtle, yet complex interdependencies between behavior and environment. The basic premise of ecological studies is that the environmental demands of the classroom both shape observed behavior and establish limits to the range of response options available to the actors (Doyle, 1977). In other words, "settings have plans for their inhabitants' behavior, and inputs are achieved within the limits of the settings' control system to produce the planned behavior" (Barker, 1963).

What this means for teachers is that not only is the classroom environment complex and unpredictable, but teaching behavior may be to a large degree "controlled" or "planned" by the environment itself.

If it is true that classroom teaching behavior is, to a large degree, a function of the environment, then it becomes important to ask how the teacher might influence the environment so that behavior within the interactive setting will conform to his or her goals. It may be that teacher planning is the major tool by which teachers manipulate the environments that may later shape and control their own behavior.

## Planning Models

Until recently, the literature on planning in education and in other fields has been dominated by theoretical and prescriptive dicta. Education for the most part has adopted a rational model of planning based on models from economics and from national and city planning theory. The Rational Choice model, as it will be referred to here, in essence requires;

1. the setting of goals,
2. formulation of alternatives,
3. prediction of outcomes for each alternative, and
4. evaluation of each alternative in relation to the goals and outcomes.

In education, this approach to decision making has been advocated in a model of curriculum planning, first proposed by Tyler (1950) and later elaborated by Taba (1962) and Popham (Popham & Baker, 1970). This model recommends four steps for effective planning:

1. Specify objectives.
2. Select learning activities.

3. Organize learning activities.

4. Specify evaluation procedures.

This model is basically a rational means-ends model. Curriculum planning is thus characterized as a task that requires orderly and careful thinking, and this model is proposed as a rational and scientific method for accomplishing this task. Because of this rational and scientific appeal, this model has been prescribed for all types of educational planning -- from the most comprehensive curriculum planning to the teacher's daily lesson planning.

The only alternative suggested to this rational model of teacher planning is the "integrated ends-means model" (term coined by Zahorik, Note 3) proposed by MacDonald (MacDonald, 1965; MacDonald, Wolfson, & Zaret, 1973) and Eisner (1967). They suggest that teachers do not begin their planning by thinking about objectives and then proceeding to decisions about activities, evaluation, and so forth; rather, teachers focus first on the type of learning activity that will be provided for the students. They argue that objectives arise and exist only in the context of an activity, as a result of students choosing their own learning experiences and pursuing their own objectives. Thus, in this model, ends for learning become integrated with means for learning, and the specification of goals prior to an activity becomes meaningless.

## Previous Studies of Teacher Planning

Though researchers like Jackson (1965) have long pointed to the importance of looking at teacher behavior in the preactive setting, relatively few studies have ventured into this domain. Empirical studies of teacher planning have been conducted only since 1970, and to date, those published

can still be counted on one hand.

Zahorik (1970) did the first empirical study of classroom behavior. He provided six of a sample of 12 teachers with a partial lesson plan containing behavioral objectives and a detailed outline of content to be covered during a two-week period. He asked the other six teachers to reserve an hour of instructional time to carry out a task for the researchers, not telling them what they were going to be asked to do (teach a lesson on credit cards) until just before the appointed time.

Zahorik analyzed recorded protocols of the 12 lessons, focusing on "teacher behavior that is sensitive to students." He defined this behavior as "verbal acts of the teacher that permit, encourage, and develop pupil's ideas, thoughts, and actions" (p. 144). Upon examining the protocols, Zahorik noted that the teachers who had planned exhibited less honest or authentic use of the pupil's ideas during the lesson than non-planners. He concluded that the typical planning model - goals, activities, and their organization and evaluation - result in insensitivity to pupils on the part of the teacher.

Taylor (1970) conducted a study of teacher planning in British secondary schools. Holding group discussions with teachers, analyzing course syllabi, and administering a questionnaire to 261 English, science, and geography instructors, he concluded that the most common planning theme across all of the modes of data collection was the prominence of the pupil, especially his/her needs, abilities, and interests. Following, in order of importance, were the subject matter, aims (goals), and teaching methods. Taylor discovered that the teachers paid little attention to either evaluation or their own courses and the curriculum as a whole.

With teacher ratings of the importance of various issues in curriculum planning and a factor analysis of their responses, Taylor identified four factors of primary interest to his teacher sample. The results generally indicated that, when planning, the teachers tended to consider (in order of importance): (1) factors associated with the teaching context (e.g. materials and resources), (2) pupil interest, (3) aims and purposes of teaching, and (4) evaluation. Rather than beginning with purposes and objectives and moving to a description of learning experiences necessary to achieve the objectives (as the rational planning theorists propose), Taylor found that these teachers began with the context of teaching and next considered which learning situations were most likely to interest and involve their pupils; only after these first two steps did they consider the purposes their teaching would serve. Also, contrary to what the theorists suggests, criteria and procedures for evaluating the effectiveness of their course of teaching were relatively unimportant to the teachers.

Zahorik (Note 3) continued this line of inquiry by examining the use of behavioral objectives and the "separate ends-means" model of planning as well as the use of the "integrated ends-means" model proposed by MacDonald (1965) and Eisner (1967). Zahorik asked 194 teachers to write a list of the decisions they make prior to teaching and to indicate the order in which they make them. He classified their decisions into the following categories: objectives, content, activities, materials, diagnosis, evaluation, instruction, and organization. He found that the kind of decision listed by the greatest number of teachers was that relating to pupil activities (indicated by 81% of the teachers). The decision teachers said they most frequently made first was content (51%); decisions about behavioral objectives were a distant second (28%).

Zahorik concluded that teacher planning decisions do not always follow logically from a specification of objectives and that, in fact, objectives are not particularly important to teachers making planning decisions. He also argued, however, that the integrated ends-means model is not a functioning reality, because relatively few teachers (only 3%) said they began their planning my making decisions about activities.

Research on teacher planning has only recently begun to focus on teacher decision making in actual planning situations. Peterson, Marx, and Clark (Note 4) examined planning in a laboratory situation, studying 12 teachers as they prepared to teach a new instructional unit to groups of junior high school students with whom they had had no previous contact. (These units were taught to three different groups of eight students on three different days.) During their planning periods, teachers were instructed to "think aloud," and their verbal statements were later coded into planning categories such as objectives, materials, subject matter, and process. The following results were obtained from this study:

1) Teachers spent the largest proportion of their planning time on content (subject matter) to be taught.

2) After subject matter, teachers concentrated planning efforts on instructional processes (strategies and activities).

3) The smallest proportion of planning time was spent on objectives

All three findings were consistent with those reported by Zahorik (Note 3) and by Goodland, Klein, and Associates (1974). The third finding (concerning objectives) was also similar to results reported by Joyce and H Harootunian (1964) and by Popham and Baker (1970).

A study by Morine (Note 5), conducted in a semi-controlled classroom setting, also yielded results consistent with those from the Peterson, Marx, and Clark (Note 4) study. Morine collected written plans for two experi-

menter-prescribed lessons (one each in mathematics and reading) taught by teachers in their own classrooms to a subset of their students. Teacher plans were analyzed according to (1) specificity of written plans, (2) general format of plans, (3) statement of goals, (4) source of goal statements, (5) attention to pupil background and preparation, (6) identification of evaluation procedures, and (7) indication of possible alternative procedures. Morine found that in planning, the teachers were fairly specific and used an outline form but paid little attention to behaviorial goals, diagnosis of student needs, evaluation procedures, and alternative courses of action.

The study of teacher planning I will present here was undertaken to investigate three questions about teacher planning which have not been addressed by previous research:

1. What does teacher planning look like as it occurs naturally in the classroom over long periods of time?
2. What types of problem-solving and decision-making processes are involved in teacher planning?
3. What models of the planning process can be developed from actual planning behavior in a naturalistic setting?

## Method

The primary objective of this study was to describe those mental processes in which teachers engage while making preactive planning decisions. This objective was approached by means of a detailed descriptive case study of one elementary teacher's planning decisions for a five-month period. The study was designed to address a need for descriptions and theoretical models of planning processes and to examine the usefulness of certain decision-modeling methods for describing complex decisions made in field

settings. The method chosen involved both the participant-observer strategy common to ethnographic studies in sociology and anthropology and the process-tracing strategy, proven to be effective in studies of problem solving and decision making in laboratory and restricted field settings.[4]

The teacher selected for this study taught a combined first- and second-grade classroom in a Michigan school district. She was in her sixth year of teaching, three of which had been spent in a special education classroom and three in the first- and second-grade "split" classroom. She was regarded as a very organized and creative teacher who spent much time in planning activities and was highly respected by her colleagues. She was in her early thirties and, prior to teaching, had earned a bachelor's degree in social work and a master's degree in special education.

Two phases of data collection were involved in the study. During the first 12 weeks, I spent approximately 40 full school days observing and recording the teacher's activities in both the preactive and interactive phases of teaching. Functioning as a "participant-observer" in the classroom, I collected ethnographic descriptions of teaching. Sitting quietly at a spot that offered full view of all activities, I took notes and recorded as much of the classroom action (focusing on the teacher) as possible. At times when the students were not in the classroom, I "shadowed" the teacher, following her and recording her behaviors and statements. At these moments, the teacher engaged in an on-going "thinking-aloud" process; that is, she attempted to verbalize her thoughts regarding the activities in which she was involved. I kept notes throughout this process and often asked questions to gain clarification or elaboration of her statements. During more delibera-

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[4]See Shulman and Elstein (1975) for a description and discussion of "process tracing" and other decision-modeling methods. See McCall and Simmons (1969) for a comprehensive introduction to participant observation.

tive instructional planning sessions, the teacher's thinking-aloud was also tape-recorded. By using these techniques, I obtained a detailed written description of the teacher's behavior which portrayed planning decisions within the context of days, weeks, and months.

In the second phase of the data collection I further investigated the teacher's planning by observing her behavior in the Teacher Planning Shell (a simulation task developed for this study). In addition, she participated in three judgment tasks designed to reveal her perceptions of her students and instructional activities. Additional classroom observations and interviews were also conducted during this phase.

Basically, two types of data were generated and analyzed in this study: (1) detailed field notes of the preactive and interactive teaching activities occurring on observation days; and (2) detailed notes or audio recordings made during the teacher's planning and during her participation in the Teacher Planning Shell and the judgment tasks.

The field notes were intended to provide a running account of the teacher's behavior. As incidents occurred, I recorded as many features of the behavior and situation as possible. Attempts were made to record what was said, who said it, the nature and location of the activity, the participants, the noise level, tone of voice, posture, facial expression, and so forth. To sort out complex situations, I focused on the teacher's behavior, recording students' behavior only when they interacted with her.

Analysis of the field notes proceeded in the following manner. At the end of each observation day, the notes were recorded onto cassette tapes to be later transcribed. Putting the field notes into this form helped me review the day's activities and provided a further stimulus to thinking about the teacher's planning in relation to classroom activities. /When the notes

were transcribed, I reread them, looking for broad patterns of behavior in the interactive setting that seemed related to planning decisions. As the study progressed, the field notes became the background for interpreting planning behavior, since they revealed the various factors that seemed to influence classroom planning and shed light on the factors that affected the implementation of activities.[7]

The notes and tape recordings of the planning sessions were analyzed in a similar manner. Because of the difficulty of transcribing the audio tapes, I analyzed then by listening repeatedly to the decision protocols and summarizing their content, making special note of decision components and processes. The variety and complexity of the different planning situations precluded an analysis of protocols at a level similar to those used in previous process-tracing analyses; however, a model of the planning process was constructed that reflected the process at a more meaningful level.

In analyzing data and developing the model, I followed a general procedure in qualitiative analysis advocated by Becker (1958) and also by Smith and Geoffrey (1968). The steps in this procedure included

1. selection and definition of problems, concepts, and indices,
2. analysis of the frequency and distribution of phenomena,
3. construction of models,
4. final analysis and presentation of results.

Time became an important tool in the analysis. Concepts, methods, and processes gradually surfaced in the data after I spent extended periods observing and describing the teacher's decision behavior. As process elements became apparent, they were formulated into working hypotheses to be examined in future situations and against previous field notes. As models were further developed, they were discussed with colleagues, many of whom were

or had been classroom teachers. Thus, over time, concepts were defined and tested against classroom observations, and descriptive and theoretical models of teacher planning gradually took form.

## Results

### The Teacher's Planning Technology

Two central aspects of the teacher's planning and instruction that emerged were planning for instructional activities and the use of teaching routines.

Activities. Activities were described as the basic structural units of planning and action in the classroom. Nearly all classroom action and interaction took place within the boundaries of an activity; the remaining time was used for preparation for or transition between activities.

Activities played an important role in the teacher's planning decisions. Daily planning, weekly planning, and unit planning all involved to a large degree the organization and sequencing of activities. For example, when the teacher planned a unit for science or social studies, her first step was to gather all the materials she could find on the topic, look thorugh them, and then list activities that might be carried out as part of the unit. The activities were based either on the materials themselves or on ideas the teacher developed from the materials. Once she had chosen general sequence for the unit she concentrated her planning on the selection and sequencing of activities.

Activities played the functional role of controlled behavior settings in the teacher's planning and instruction. Behavior settings are ecological units of behavior described by ecological psychologists (e.g., Barker, 1963, and Doyle, 1977). Kounin (Note 6) states that behavior settings have four distinct features: (1) definite temporal and spatial boundaries (2) a

physical milieu with props (books, pencils, and so forth), (3) a standing pattern of behavior, and (4) interaction between the physical compnents and the standing pattern of behavior. Activities, as defined in this study, could be considered the equivalent of "controlled" behavior settings, because not only was the behavior of the teacher signaled and controlled by the setting (the activities) as the ecological psychologists suggest, but the setting itself was largely created and controlled by the teacher, ahead of time. Through plannning, the teacher was able to structure activities to increase the probability of signaling and eliciting behavior that conformed to her purposes. Thus, even if the teacher's behavior in the activity was essentially a reaction to the pupil's actions, she had already established general boundaries and guidelines for behavior through preactive planning.

Seven features were identified during the study that characterized instructional activities in the teacher's classroom. These features were similar to those cited by Barker (1963) and Kounin (Note 6) in their descriptions of behavior settings, but were expanded to include components especially salient in instructional settings. The features were:

1. location
2. structure and sequence
3. duration
4. participants
5. acceptable student behavior
6. instructional moves
7. content and materials

The teacher made planning decisions about these features for each instructional activity. For some activities, decisions were made quite often, but in most cases, only one or two were necessary, and the activity became fixed

or routinized.

In the list of features "location" refers to the physical spot at which an activity is conducted. The activity might take place, for instance, on the rug in the corner of the room, at the students' seats, at one of the work tables, or in another location in the building. "Structure and sequence" refers to the phases and components of action involved in an activity. In this classroom the general structure and sequence of an activity included three major components: (1) set-up (includes such things as passing out materials, directing students to certain locations in the room, rearranging desks, pulling down shades or projection screens, etc.), (2) lesson (whole class, group, or individual work involving such things as reading, reciting, discussing or writing), and (3) take-down (returning to one's seat, collecting mateials, cleaning-up). "Duration" pertains simply to the length of time an activity lasts. "Participants" in activities are determined largely by teachers' decisions about grouping. The teacher in this study conducted most of her activities with the whole class or with small groups. "Acceptable student behavior" refers to that student action which a teacher considers appropriate and permissable for a given activity. The teacher in this study differed from activity to activity in terms of the amount of student talk, general noise level, and student mobility that she accepted. "Instructional moves," the other major interactional component of activities are those steps which a teacher takes in carrying out an activity (such as giving instructions, questioning, presenting information, monitoring, evaluating student performance, and offering feedback). A classification of this teacher's instructional moves with Gump's (Note 7) teacher-role categories indicated that she generally took a more student-centered role, such as

"watcher-helper" or "action-director," than a more teacher-centered role, such as "recitation leader" or "instructor-demonstrator." "Content and materials" refers specifically to what an activity is about and the means used to undertake it. Decisions about content and materials were the most frequent activity-related decisions made by this teacher in her planning.

Routines. The second distinctive characteristic of the teacher's planning technology was her use of routines. Routines were a mechanism that she used to establish and regulate instructional activities and to simplify the planning process. Routines also served to increase the predictability and to reduce the complexity of the teaching environment. They played such a major role in the teacher's planning behavior that her planning could be characterized as decision making about the selection, organization, and sequencing of routines.

Four types of routine were identified: activity routines, instructional routines, management routines, and executive planning routines. Activity routines function to control and coordinate the features of instructional activities. The teacher managed a large number of activities in her classroom by routinizing as many of the activity components as possible. By the middle of the school year, only 14% of the instructional activities were not routinized (when routinization is defined as having four or more of the seven activity features mentioned above set or established prior to weekly planning).

Instructional routines are the methods and procedures the teacher established to carry our specific instructional moves. These routines were, in effect, strategies or styles of teaching that were developed over time, and they occurred in established configurations and sequences. The teacher used the instructional routines for questioning, monitoring,

giving instructions, etc.

Management routines are procedures she established for controlling and coordinating classroom organization and behavior not specifically associated with an activity. Management routines regulated such things as transition between activities, passing out or collecting materials, leaving the room, cleaning up the room, and starting school in the morning or after lunch.

Executive planning routines are a system of established thought patterns set off by specific planning tasks; they result from the teacher's experience in numerous similar situations. These routines activate and guide planning processes in the same way that cognitive strategies activate and guide learning in models of learning (e.g., Gagné, 1970). Executive planning routines were manifest in the teacher's use of established patterns for daily, weekly, and unit planning.

In this study, routines were seen to function in two major ways. First, they increased the teacher's flexibility and effectiveness by reducing the time and energy she put into planning and implementation decisions; the routinization of action fixed certain aspects of behavior and thus reduced the number of characteristics of instructional situations that she had to evaluate, decide upon, and manipulate. Second, routines increased the predictability and reduced the complexity of the classroom environment for the students. This allowed the students to better predict the direction in which an activity was going and what would be expected of them as participants. The result was that more time was spent on content and less on procedure.

A Structural Model of the Teacher's Planning

Five basic types of planning activity were identified in this teacher's instruction and incorporated into a Structural model. Because of their hierarchical organization and focus on different spans of classroom activity, these types are referred to as levels of planning. The planning levels portrayed in the model are: (1) yearly planning, (2) term planning, (3) unit planning, (4) weekly planning, and (5) daily planning.[5] Figure 1 illustrates the five basic levels plus two others -- institutional planning and planning for next year -- which interact with preactive planning. Yearly planning involves selection of general materials, pupil placement, and sequencing and organizing teaching for the whole school year. Term planning centers on activities that will occur during the 12 weeks before the next break. Unit planning refers to developing an instructional unit for a specific subject matter that will be taught over a period of several weeks within a term. Weekly planning focuses on activity that will occur as part of the schedule on Monday through Friday, while daily planning involves the last-minute modifications or preparations to be made during the day or before school starts the next day.

Four of the model's five levels of planning were directly observed in this study; the fifth, yearly planning, was only indirectly observed, since research was conducted during winter and spring terms and there was no opportunity to observe planning at the beginning of the school year. Information on yearly planning was obtained through teacher interviews and through teacher recall stimulated by using the teacher's plan book to re-create the planning that occurred before school started and during the first term. The model was

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[5]Although planning may occur in the interactive teaching setting, it was not a focus of this study and is not a part of the model.

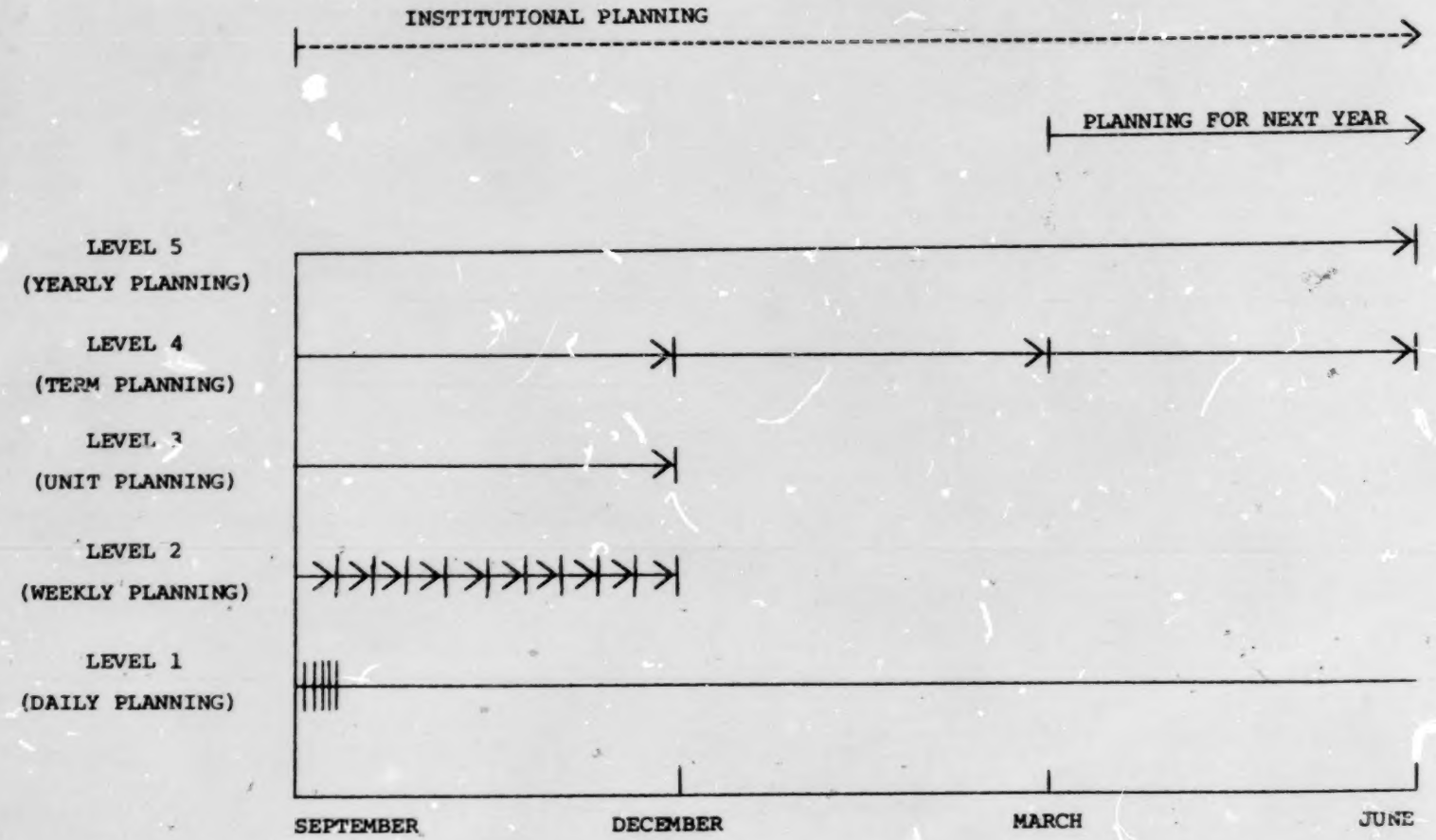


Figure 1 A structural model of preactive planning.

basically developed through observation and interviews during the study. This was further corroborated by the teacher's description of her own planning.

To describe and differentiate planning at each of the five levels in the model, four dimensions of the planning process were discussed: (1) planning goals, (2) information sources, (3) form of the plan, and (4) criteria for judging planning effectiveness. The description of these four dimensions of each planning level was based on several data sources. The teacher's planning goals were obtained, for the most part, through discussion, interview, and observation of her on-going planning. Data on the sources of information she used in planning were gathered from observation and the pupil and activity judgment tasks mentioned on page 11. The form of the teacher's plans was observed during the study, and the description of her criteria for judging planning effectiveness was based on observation, interview and analysis of past plans. The table provides a summary of the characteristics of each of the four dimensions for each level of planning.

The interaction of planning at various levels. An important question is raised by a structural model such as this: "How are the different levels connected and under what circumstances do they interact?" In this study, the interaction among the different levels of planning was most visible at six points in time: (1) the beginning of the year, (2) the beginning of the term, (3) the third week in the term, (4) the beginning of unit planning, (5) when the weekly schedules were planned, and (6) the end of the school day. These connections are illustrated for fall term in Figure 2.

Interaction among several levels occurred at the beginning of the school year. As the teacher got to know the students during the first few weeks of school, she elaborated and modified her yearly planning. At the

Table 1: Planning at each level of the model

| | Planning Goals | Information Sources | Form of the Plan | Criteria for Judging Planning Effectiveness |
|---|---|---|---|---|
| **Yearly Planning** | 1. To establish general content (fairly general and framed by district curriculum objectives)<br>2. Establishing basic curriculum sequence<br>3. Ordering and reserving materials | 1. Students (general information about numbers and returning students)<br>2. Resource availability<br>3. Curriculum guidelines (district objectives)<br>4. Experience with specific curricula and materials | General outlines listing basic content and possible ideas in each subject matter area. (spiral notebook used for each subject) | 1. Comprehensiveness of plans.<br>2. Fit with own goals and district objectives |
| **Term Planning** | 1. Detailing of content to be covered in next three months<br>2. Establishing a weekly schedule for term that conforms to her goals and emphases for the term | 1. Direct contact with students<br>2. Time constraints set by school schedule<br>3. Availability of aides | 1. Elaboration of outlines constructed for yearly planning<br>2. A weekly schedule outline specifying activities and times | 1. Outlines - comprehensiveness, completeness, and specificity of elaborations<br>2. Schedule - comprehensiveness fit with goals for term balance<br>3. Fit with goals for term |
| **Unit Planning** | 1. Developing a sequence of well organized learning experiences<br>2. Present comprehensive, integrated and meaningful content at an appropriate level | 1. Student abilities, interests, etc.<br>2. materials, length of lessons, set-up time, demand, format<br>3. District objectives<br>4. Facilities available for activities | 1. Activity and content lists or outlines<br>2. Sequenced activity lists<br>3. Notes in plan book | 1. Organization, sequence balance, and flow of outlines<br>2. Fit with yearly & term goals<br>3. Fit with anticipated student interest and involvement |
| **Weekly Planning** | 1. To lay out the week's activities within the framework of the weekly schedule<br>2. Adjusting schedule for interruptions & special needs<br>3. Maintain continuity & regularity of activities | 1. Student performance in preceding days and weeks<br>2. Scheduled school interruptions (e.g., assemblies holidays)<br>3. Continued availability of materials, aides, and other resources | 1. Activity names and times entered into a plan book<br>2. Day divided into four instructional blocks punctuated by a.m. recess, lunch, and p.m. recess | 1. Completeness of plans<br>2. Degree to which weekly schedule has been followed<br>3. Flexibility of plans to provide for special time constraints or interruptions<br>4. Fit with goals |
| **Daily Planning** | 1. Set up and arrange classroom for next day<br>2. Specify activity components not yet decided upon<br>3. Fit daily schedule to last-minute intrusions<br>4. To prepare students for day's activities | 1. Clarity of instructions in materials to be used<br>2. Set-up time for activities<br>3. Assessment of class "disposition" at start of day<br>4. Continued interest, involvement & enthusiasm | 1. Schedule for day written on the chalkboard & discussed with students<br>2. Preparation and arrangement of materials and facilities in the room | 1. Completion of last-minute preparations and decisions about content, materials, etc.<br>2. Involvement, enthusiasm, and interest communicated by students |

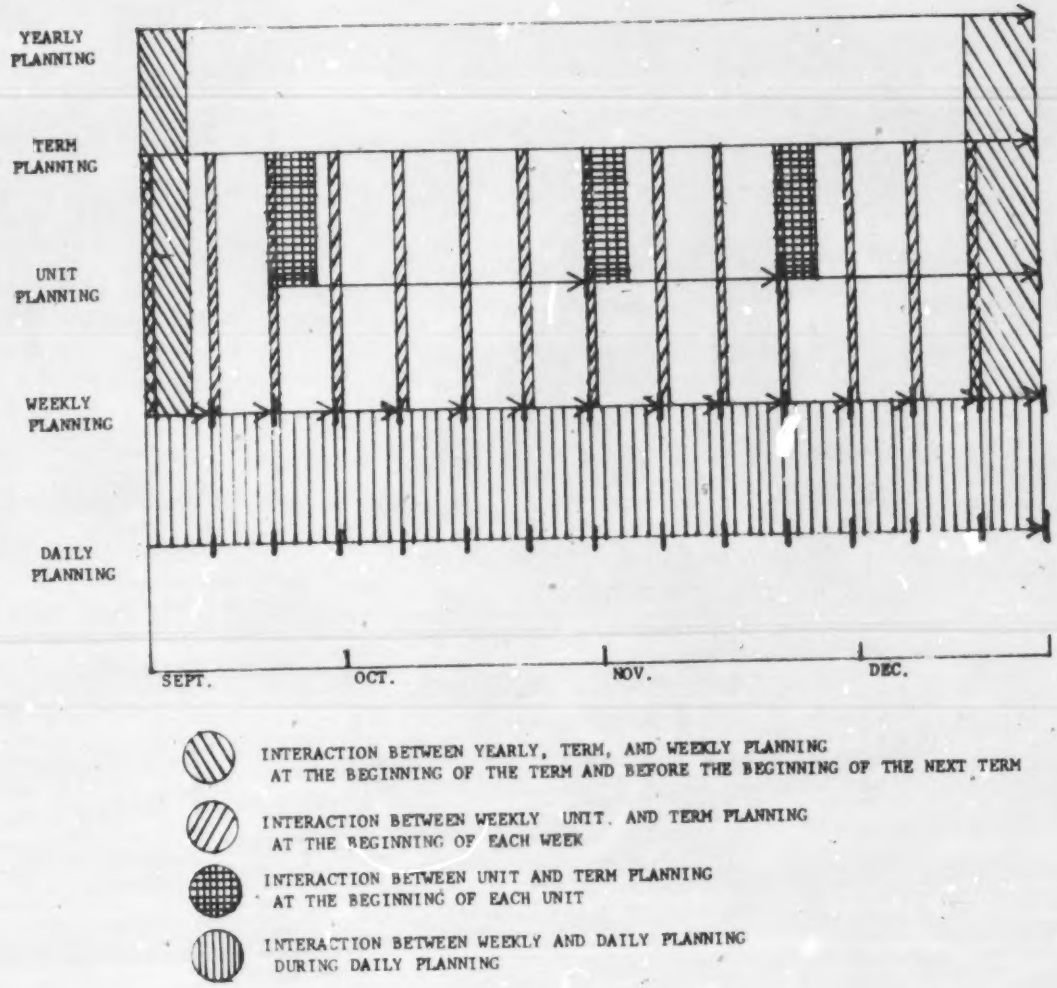
YEARLY PLANNING
TERM PLANNING
UNIT PLANNING
WEEKLY PLANNING
DAILY PLANNING
SEPT.
OCT.
NOV.
DEC.
INTERACTION BETWEEN YEARLY, TERM, AND WEEKLY PLANNING AT THE BEGINNING OF THE TERM AND BEFORE THE BEGINNING OF THE NEXT TERM
INTERACTION BETWEEN WEEKLY UNIT, AND TERM PLANNING AT THE BEGINNING OF EACH WEEK
INTERACTION BETWEEN UNIT AND TERM PLANNING AT THE BEGINNING OF EACH UNIT
INTERACTION BETWEEN WEEKLY AND DAILY PLANNING DURING DAILY PLANNING

Figure 2 Interaction between levels of planning (illustrated for fall term).

same time she laid out plans for fall term and developed a weekly schedule. This yearly and term planning did not react significantly with daily and weekly planning until the third or fourth week of classes, since early-year activities were of the standard orientation and diagnostic kind that the teacher always used.

At the beginning of the term, interaction between yearly and term planning was most visible. As the teacher laid out the term, she consulted her yearly plans for general sequence and content. About three weeks into the term, when the teacher began to refine her tentative weekly plans, interaction among daily, weekly, and term planning became stronger. At this time, the weekly schedule was sometimes modified, since the teacher felt the students had had enough time to adjust to it; she perceived that any problems in the schedule at this point were not merely related to student adjustment. Modifications were based on actual classroom outcomes and on problems the teacher encountered in her weekly or daily planning.

When the teacher began unit planning she was influenced to a great extent by the plans she had set for the term. The number of periods set aside for the unit per week influenced the length of the unit, which, in turn, influenced the scope of the unit. Unit planning also interacted with weekly planning as the unit activities were fit into the weekly schedule. And weekly planning required connections with term planning as the teacher integrated the week's activities with her goals and priorities for the term.

The relationship between daily and weekly planning was most commonly observed at the end of the school day, when most daily planning occurred. Daily planning was usually a function of what had been specified for the week. Occasionally, weekly plans were modified as a result of the day's activites.

Each of these six points in time (described above) when the different levels of teacher planning interact most visibly may be thought of as potential research sites -- sites at which teacher planning can be examined in more detail. In this study, planning was most explicit at these times, since several planning levels were interacting. Although it might be unreasonable to assume that other teachers plan the same way as this teacher, her most active and visible planning times might serve as guides to strategic research sites in other teachers' planning.

A Process Model of Teacher Planning

In addition to providing a description of one teacher's planning, this study was intended to formulate a general model of the teacher planning process. This process model has two major purposes: (1) to describe and represent in a schematic form speculations about the components of teacher planning and the interrelationships among them, and (2) to serve as a basis for further theory and research on teacher planning.

The process model is grounded on three data bases. The first is the data collected in the field research portion of the study. The field research revealed much about this teacher's planning; that her planning focused on instructional activities; that many of those activities were well routinized; and that by winter term, planning was devoted primarily to social studies and science units. The teacher's planning, it was found could be described at five levels, each of which could be distinguished in terms of goals, information used, the form of plan, and criteria for judging planning effectiveness. It was also discovered that reliance on past experience was a prominent part of the teacher's planning while choice (the selection among alternatives) was not; instead, she tended to develop and elaborate activities

over time. Furthermore, this elaboration took place as activities passed from general (e.g., yearly or term)to more specific (e.g., weekly or daily) levels of planning.

The second source of data for the process model is previous research on teacher planning. Two findings are of special interest here: (1) that objectives are not a primary object of teacher decision making during the planning process (Zahorik, Note 3; Peterson, Marx, and Clark, Note 4), and (2) that well-developed alternatives are lacking in teachers' plans (Morine, Note 5). Both findings support the notion that teacher planning, in practice, is not characterized by processes advocated in the rational choice model. Previous studies indicate that, when planning, teachers are more concerned about content and activities than about objectives and alternatives.

The third data base is psychological studies of problem solving and planning conducted in deliberative situations in mathematical problem solving (Selz, 1922, 1924), chess playing (deGroot, 1965), musical composition (Bahle, 1930, 1936), art (Getzels & Csikszentmihalyi, 1976), and architectural design (Eastman, 1970, Note 8; Baer, Note 9). The basis for using this data in constructing the model is "theory translation" (Snow, 1973). Theory translation is the process of borrowing a theory or part of a theory from one situation and applying it to another based on similarities between the two situations. The similarities among the situation in teacher planning and those of selecting a move in chess, composing a musical or visual composition, or planning for space utilization in a building suggested the usefulness of adopting concepts from research on these thinking processes.

The focus of the process model is the individual, preactive, deliberative information processing involved in planning, from an initial idea to its implementation. The preactive stage was chosen since that is when most instructional planning occurs. Processes of planning were examined in order to shed light on possible planning methods used by teachers; the lack of knowledge in this area (as I have discussed) makes the need for such a description apparent.

This model deviates from traditional models of planning primarily in that it emphasizes the discovery and design processes rather than the choice processes. In short, the model portrays planning as "purposeful problem solving' as opposed to "rational choice."

The general-process model of teacher planning is illustrated in Figure 3. The model represents three stages:

I. Problem Finding

II. Problem Formulation/Solution (Design)

III. Implementation, Evaluation, and Routinization

Stage I is the first step in planning. It is here that the general planning task is translated into a specific planning problem. Factors shaping the problem are the planning dilemma, the teacher's goal conceptions, his/her knowledge and experience, and materials available. The product of this problem-finding stage is an "initial problem conception" to be elaborated in the problem formulation/solving stage.

Stage II is the point at which most planning energy and time is invested. The primary process in this stage is the "design cycle," in which the initial activity idea is repeatedly elaborated and tested until a satisfactory solution is found.

Actual implementation and evaluation of the activity takes place in Stage III. During this stage, the teacher obtains information about how workable the activity is with his/her children -- information which might lead to further modifications or even rejection of the activity. If the activity is successful, it may eventually be routinized. Experience with both successful and unsuccessful activities and routines is eventually fed back to long-term memory, where it becomes part of a repertoire of knowledge and experience to be used in future planning.

These three stages of planning, characterizing the teacher planning process from idea to implementation, will be described in more detail below.

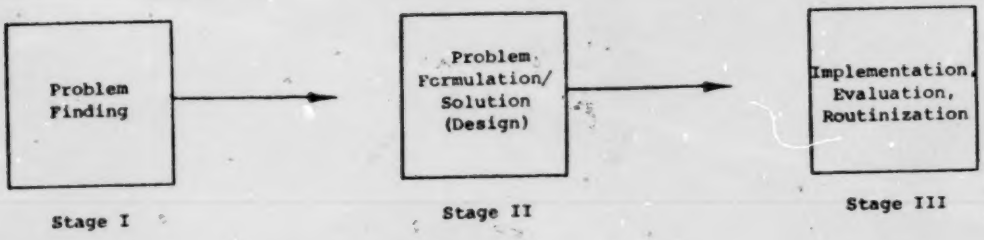


Figure 3: Stages of the Planning Process

Problem finding. Problem finding is the process by which someone becomes aware of a specific problem that needs to be solved within a general, non-specified problem situation. In the context of teacher planning, problem finding refers to the discovery of a potential instructional idea

that requires further planning and deliberation. This idea is referred to as a problem since, at this early stage, the teacher still doesn't know if this idea can be realized in the classroom and, if so, how it will be implemented. Since the teacher in this study focused on activities in her instruction the problems that surfaced in her problem finding were usually ideas for activities. Other problems that might come to light during this stage include plans themselves (e.g., weekly plans) or specific lessons.

Figure 4 illustrates the problem-finding process in more detail. Problem finding is portrayed as interaction among the planning dilemma confronting the teacher (arising from the general teaching dilemma), teaching knowledge and experience, teaching goals, and the teaching materials available. The sensing, searching, generation, and manipulation of ideas based on these elements is referred to as the discovery cycle. The product of this cycle is a statement of a problem (idea) in the form of an initial problem conception which becomes the basis for further elaboration (planning).

The general teaching task is represented in the model by the "general teaching dilemma." One way to conceptualize this dilemma is to think of the teacher being told, "Here is your classroom; here are your students; teach them." Although this is obviously an oversimplification, it may come closer to characterizing the "openness" in many teaching and planning situations than one might think.

Three major influences on the general teaching dilemma are identified in the model: (1) the teaching environment and organization, (2) curriculum resources available for teaching, and (3) pupil characteristics. The environment and organization include such elements as the physical characteristics of the classroom and the school, number of students in the class, length of the school day, and the teacher's relationships with the principal and other

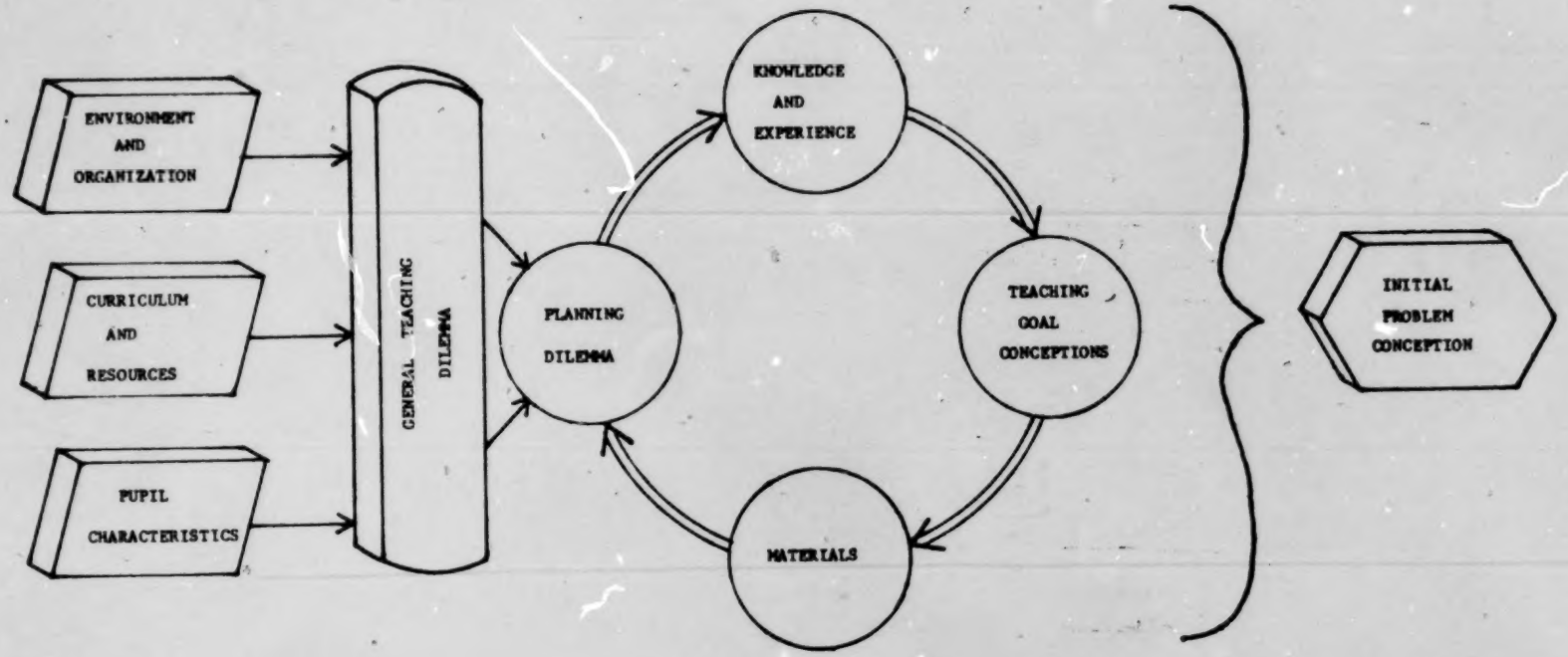


Figure 4: The problem finding stage of teacher planning.

teachers. Curriculum and resources available for teaching refer to the guidelines inherent in school or district objectives and in student evaluation forms, programs, kits, and materials supplied to the school for teaching certain subjects; resource instructors available for teaching certain subjects (e.g., art or music); and aides available for helping in the classroom. Included under pupil characteristics are such things as student background and teacher judgments of student ability, maturity, attention span, ability to work in a group, and so forth.

The fact that teachers differ in terms of materials and activities they use, even at similar grade levels in the same school, raises the question of where ideas and activities originate. If they arise solely from the general teaching dilemma, it would seem likely that teachers in similar situations would be teaching in similar ways. But this is not the case.

The discovery cycle helps account for the uniqueness and originality of teaching by including in problem finding four components: the planning dilemma, teaching knowledge and experience, goal conceptions of teaching, and teaching materials.

The planning dilemma is a direct outgrowth of the general teaching dilemma. Because teaching is complex, immediate, and unpredictable, planning is a near necessity; thus, the planning dilemma is created. The planning dilemma might be stated in its most general form as, "I've got to plan for this unit (or activity, lesson, etc.)." The specificity of the planning dilemma may change as planning proceeds over time; in this manner, the planning dilemma frames the problem-finding process at various levels of specificity. This might be described in information-processing terms as a way of establishing the "problem space" for problem finding.

"Teaching goal conceptions" are one of the two goal components in this planning model. The other is the "total problem conception" that is part of the design cycle in the problem formulation/solution stage. Both these terms are modeled after deGroot's (1965) notion of "Total Goal Conception," which refers to a problem solver's anticipatory conception of the problem's solution, or the "goal-as-attained." This concept includes all features of the goal and the problem which the problem solver might consider. It was chosen as a model for the goal components in this planning model because: (1) the schematic, incomplete character of the total goal conception that is gradually modified and elaborated during the problem-solving process seemed to capture accurately the orientation towards goals and objectives of the teacher in this and previous studies of planning; (2) it is comprehensive enough to include cognitive and affective expectancies for solving a problem, and (3) it incorporates a dynamic motivational element into the model in terms of expectancies and anticipations of realizing the total goal. In this model, "teaching goal conceptions" refers to the teacher's anticipatory notions of what effective teaching might be for a specific group of students, including conscious, explicitly-stated goals and objectives (both cognitive and affective). It also refers to vague intuitions, disposition, or attitudes toward teaching that a teacher might have.

Knowledge and experience as portrayed in this model, refers to: (1) the ways in which the teacher has learned to perceive problem situations, and (2) the knowledge and methods the teacher can draw from his/her memory. In problem finding, knowledge and experience provide the teacher with a repertoire of ideas (problems) that may serve as a basis for initial problem conception, influence the direction of the problem-finding process by means of executive planning routines, and provide a screen for potential

ideas by comparing them with the success or failure of similar ideas in the past.

The fourth major component of the discovery cycle is materials. This component includes not only those teaching materials provided by the school or district, but any potential source of teaching ideas available to the planner. The sole function of materials in the discovery cycle is to provide the planner with a resource for problem conceptualization; knowledge and experience serve as an internal source of ideas, and materials as the external source.

The product of problem finding is the initial problem conception -- the abstract, schematic idea (conception) seen as a worthy prospect for further elaboration. The only general constraints put on this idea are that it contributes to the completion (fulfillment) of the teaching goal conceptions and that it has not been tried and rejected in the present planning situation (i.e., it must be perceived as a worthy instructional idea that has not recently failed). These conditions are kept lax to increase the probability that enough creative ideas will emerge from the discovery cycle to provide sufficient "grist" for the subsequent design cycle.

Since the job of the discovery cycle is to generate problems, the specificity of initial problem conceptions is usually very low. The process of elaborating, formulating, and solving the initial problem to produce a plan or instructional activity takes place in the problem formulation/ solution stage of planning.

Problem formulation and solution. The basic assumption made in this second stage of planning is that problem formulation is an essential element in problem solving. Before a problem may be solved, it must first be dis-

covered and then formulated into a manageable state.

Problem formulation and solution activities in teacher planning are portrayed in this model as a design process. There are obvious parallels between the situations confronting teachers and those confronting designers. In both cases, no problem specification is given or agreed upon, no formal language with precise solution operations is available, and the goals to be achieved and the restrictions on the problem are open to interpretation. Other similarities are suggested by the research findings indicating the absence of planned alternatives (Morine, Note 5) and the peripheral nature of specific, well-defined goals and objectives in teacher planning (Zahorik, Note 2; Peterson, Marx, & Clark, Note 4).

Based on these apparent similarities, the problem formulation/solving stage of planning presented here is modeled after design processes characteristic of musical composition (Bahle, 1930, 1936), chess thinking (deGroot, 1965), and architectural design (Baer, Note 9; Eastman, 1970, Note 8). In all three situations, problem solving has been characterized as a process alternating between phases of problem development (elaboration, construction) and phases of problem reformulation (adaptation, transformation). In other words, there seems to be a common, general design process in which goals are continually developed through a cycle involving anticipation of solutions and the results of attempts at solving subproblems. The existence of these problem formulation/solving processes in such disparate endeavors as playing chess, writing a song, and designing a building adds credibility to the notion of a "principle of creative form-making" (Bahle, 1939).

The primary mechanism of problem formulation and solution is referred to here as the design cycle. Problem solving is portrayed as a design process in which plans or activities are progressively elaborated over time.

This process is illustrated in Figure 5.

The dominant feature of the design cycle is its phase structure. Development and solution of the planning problem takes place as the problem passes through phases of elaboration, investigation, and adaptation. These phases are essentially a synthesis of the "elaborative move" and "transition" phases of deGroot (1965) and Baer's (Note 9) problem formulation processes of "construction" and "adaptation." As a problem progresses through the three phases of design, two major aspects of the thought process are involved. Elaboration and investigation draw on the planner's repertoire of problem-solving methods (knowledge and experience), and adaptation is based upon the planner's total problem conception.

There are two other important general features of the design cycle. First, the process is serial in nature, with only one problem handled at a time; elaboration, investigation, and adaptation continue until the problem is "solved" or until it is rejected as unworkable. Second, the process occurs over time. The length of the cycle may very, however. At its longest, the cycle may continue across several levels of planning. For instance, plans for a unit activity might be progressively developed over a period of several weeks. At the other extreme, the cycle may last only a few minutes if an initial problem is conceived that requires only minor elaboration to become workable or if it isquickly rejected because a major obstacle to its potential workability is discovered.

The elaboration phase is the construction phase of the design cycle. Its function is to supply detail to the total problem conception[6] or to sub-

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[6]The "total problem conception" -- which, like the teaching goal conception discussed earlier, is modeled after deGroot's "total goal conception" -- refers to the problem solver's anticipatory notion of the solution to the problem, or the "goal-as-attained." It is essentially a slightly refined version of the initial problem conception that is the product of the problem-finding process. The total problem conception begins as a vague and general anticipation (i.e., as the initial problem conception) and through elaboration, is gradually specialized, differentiated, transformed, and completed.

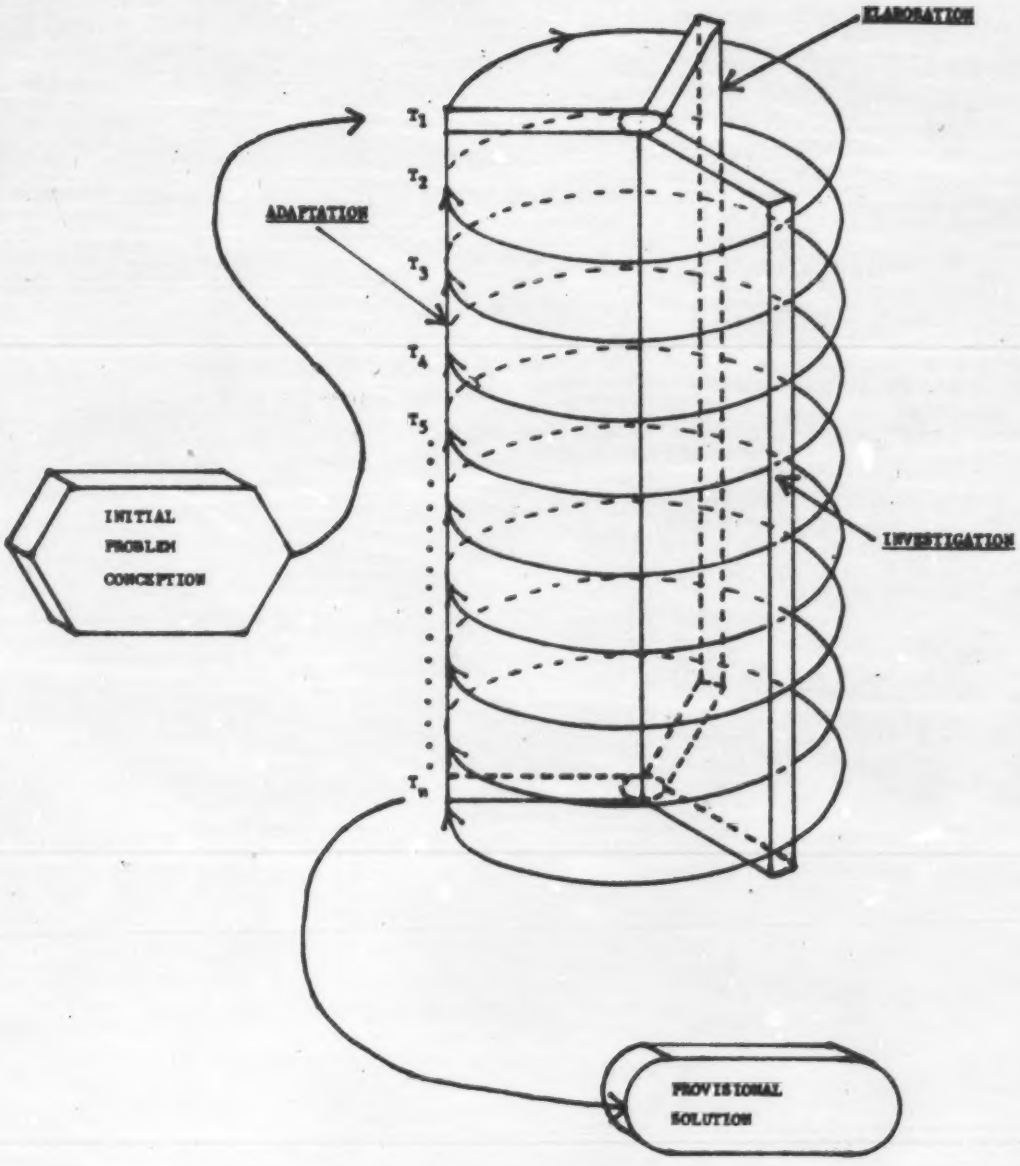


Figure 5: The problem formulation and solution (design) stage of teacher planning.

problems. In this manner it develops, or elaborates, the total problem conception.

Elaboration takes place in two ways. The first involves the recombination of thought elements or routines that already exist in the planner's memory, or in Selz's terminology, the "reproductive actualization of means." It is proposed here that for the experienced teacher, this is the primary method of problem elaboration, for several reasons. Means-ends relationships which the teacher has accrued through experience are likely to carry with them some record of success or failure. Thus, the planner has more reason to predict how successful they will be as solutions. In addition, elements stored in memory are usually readily available. This reduces the time and energy consumed in elaboration since no new means need be located.

The second method of elaboration proposed by the model involves the addition of new elements (or "means") not yet a part of the teacher's repertoire of experience. This method is referred to by Selz as "means abstraction." Here, the problem requires that new means be found to produce new results. This method is considered subsidiary to the first primarily because of the additional cost it entails. Actualizing a means reproductively will almost always be more efficient than searching for a new one. Another source of new means is the materials available for instruction. As indicated in the problem-finding stage, materials can suggest ideas to the planner. This may be especially true in the design cycle if the initial problem conception was suggested primarily by materials in the discovery cycle.

Elaboration is carried out on either the total problem conception or on specific subproblems. In teacher planning, the latter situation is more likely, since the use of subproblems allows for a more orderly and efficient approach to the complex problems involved in teaching. For example, the

primary planning concern for the teacher in this study was activities. When planning new activities, the teacher directed elaboration at the seven features of activities -- location, structure and sequence, duration, participants, acceptable student behaviors, instructional moves, and the content and materials (described above). These were the subproblems of planning for activities.

The product of the elaboration phase is a subproblem solution or the completion of a facet of the total problem conception. These products are somewhat provisional, however, since their feasibility or workability has not yet been examined. This examination is the purpose of the next phase in the discovery cycle--investigation.

The investigation phase actually has two primary functions. First, as suggested above, it provides information about the workability of the solution developed during elaboration and its success or failure. In addition, it provides new knowledge and information about the planning problem, which is especially true of failures. Here, the investigation uncovers information about aspects of the problem not part of the total problem conception and not anticipated in the previous elaboration. This information may lead to a problem transformation in the subsequent adaptation phase.

During investigation, the planner relies primarily on two thought components: (1) knowledge and methods accumulated through experience, and (2) the total problem conception. Through previous knowledge and experience, successful and efficient investigation methods are developed to facilitate this "feasibility testing" in the same way that solving methods are developed in the elaboration phase.

The total problem conception provides the criteria for investigation. The success or failure of a subproblem solution is determined by how well

it fulfilled the anticipations that accompanied the subproblem. Thus, the anticipation -- or total problem conception -- provides not only the motivation to carry out the elaboration, but also supplies the criteria against which to measure its success.

The duration and thoroughness of the investigation phase may vary immensely. The analysis may proceed in an almost totally automatic or routine manner; it may be directed, for instance, by a component of an executive planning routine and might simply involve running down a mental checklist. On the the other hand, the analysis may be more conscious and deliberative. Here, the process becomes much more of an "investigation," and elements of the solution are explored in more detail. One such method is "trying out," which was characteristic of the planning of the teacher in this study.

"Trying out" is a general solving method suggested by deGroot (1965). In this model, it refers to a mental process in which the planner tries to visualize a subproblem solution in the situation for which it is planned; in this manner, the planner obtains information about the probable success or failure of that solution. Trying out differs from trial-and-error testing in that it is goal oriented, with a specific direction in mind (i.e., testing a specific elaboration.)

For the teacher in this study, trying out mainly involved thinking through the solution and anticipating its outcomes in the classroom. This involved projection of the plan or the activity into her present class and teaching situation. This process was revealed by her frequent use of statements such as, "That will never go," "That might work," or, "I can see right now that that will never work." As a general investigative method, "trying out" seemed to increase greatly the efficiency of planning. By casting "projections" of the future (based on her knowledge and experience), the

teacher was able to get an idea of how solutions might work without having to test each one in the classroom or wait until planning had been completed.

The results of the investigation phase, whether through "trying out" or some other method, provide information about the success or failure of the previous elaboration and new knowledge about the total planning problem. Both kinds of information contribute to and influence the problem transformation in the subsequent adaptation phase.

Adaptation is the phase of the design process that completes the problem-solving cycle. It is, in effect, both the beginning and the end of a cycle because it is focused on the development and completion of the total problem conception. The total problem conception, defined earlier, refers to the problem solver's anticipatory conception of the solution to the problem or the "goal-as-attained." From the initial problem conception, an abstract idea, emerges the total problem conception, a full-fledged problem with all the accompanying features: anticipations about its difficulty or solvability, solution methods, notions of intuitive or emotional preference, and any motivational dispositions. The total problem conception is always changed as a result of elaboration and investigation. It never looks the same after an elaboration (and investigation) as it did before. Hence, in Figure 5, the initial problem conception becomes the total problem conception with the first elaboration and is changed each time the cycle is completed ($T_1$, $T_2$, $T_3$, etc.).

Whereas the previous two design phases are basically phases of elaboration, adaptation is a phase of integration and transformation. The main purpose of adaptation is to develop the total problem conception, which, in turn, directs further elaboration (problem solution). Thus, adaptation involves two processes: the integration of what has preceded and the preparation for what will follow.

The integration of what has preceded (elaboration and investigation) nearly always entails a return to a more general problem. This is so because, in most planning problems, elaborations are carried out on only a part of the main problem (e.g., a subproblem); hence, if such elaborations are to provide information for the main problem, they must be analyzed in the larger context. This integration of the part with the whole enables the planner to assess whether the previous elaboration has contributed to the completion of the main problem. Integration may also promote differentiation and specialization as subproblem elaborations make various aspects of the problem more concrete and detailed. This return to a more general problem allows for abstraction. New possibilities may stand out against the concrete form of the problem established thus far; the results of elaboration may suggest new properties of or relationships in the problem.

The second part of adaptation, as mentioned above, is the preparation for further elaboration. The adaptation phase always involves a problem transformation; this transformation may be an enrichment and completion of the main problem or some more radical structural change. Whatever the form, the transformation provides the basis for further elaboration, i.e., a freshly set, specialized subgoal.

The nature of the total problem conception is such that it is rarely rejected in its entirety; rather, in most cases, it is transformed and modified until a workable solution is achieved. This absence of "scrapped" planning problems is primarily due to the teacher's experience. In the problem-finding process, teaching goal conceptions and knowledge and experience serve as "filters" to the problem-discovery process. Thus, ideas which reach the form of initial problem conceptions have fairly good exper-

ience-based potential, it is unlikely that enough unforeseen results will turn up to render the problem totally unworkable. A problem may be radically transformed, but continuity will be maintained in many aspects of the total problem conception.

A problem is "solved" when it achieves the level of anticipation or aspiration that comprises the total problem conception. Since problem formulation takes place hand-in-hand with problem solution, the final problem formulation is not achieved until the final solution. Once these two processes finally converge, the design process is complete. However, because the designer is also the implementer in most teaching situations, the end product of the design cycle might be accepted as a final solution only if it succeeds in the classroom. That success or failure is determined in the third stage of the planning model, when implementation and evaluation take place.

Implementaton, evaluation, and routinization. The focus of this model has been preactive planning for instruction. The discussion, thus far, has been concerned with two central aspects of this process -- problem finding and the design cycle. The last stage of the model -- implementation, evaluation, and routinization -- is not preactive planning, as such, but it does provide the final link in the instructional planning process. There are two additional reasons why a discussion of this stage is important. First, it reflects the provisional nature of the products of the design process by proposing an actual "trying out" of the solution, followed by an evaluation. Second, the results of this stage feed back to and build up the repertoire of knowledge and experience which, in turn, becomes an important component of subsequent planning. The interaction among implementation, evaluation, and routiniza-

tion is illustrated in Figure 6.

The implementation, evaluation, and routinization process is applied primarily to planning for activities. I hypothesize that the other major product of planning, plans themselves, do not generally follow this sequence. The primary reason for this hypothesis is that the evaluation of plans by the teacher in this study was rarely based on how they worked out. Rather, she determined their success or failure on a structural basis beforehand; that is, on the basis of characteristics such as comprehensiveness, balance, variety, etc. (see Table 1). Since plans are merely a framework to guide future action (instruction), and since this teacher's instruction was focused on activities, she showed little concern for the quality of the plans, per se. Her own experience was usually sufficient to leave her fairly well assured of quality. By the time of this tudy, her plans that conformed to certain structural criteria nearly always served their purpose. In other words, planning had become so routinized that its effectiveness was rarely consciously scrutinized. The only exception to this was the weekly schedule established during term planning. This was, in fact, the only plan actually implemented in the classroom. Thus, the third stage of planning in the model will be discussed within the framework of planning for activities. The following description of implementation, evaluation, and routinization will be brief and schematic and rely heavily on examples from this study.

The actual implementation of an activity in the classroom is the ultimate goal of instructional planning. All planning is aimed at making this moment as successful as possible for both students and teacher. Even though activities have undergone many cycles of elaboration and mental "trying out," their success is not guaranteed until they have been tried out in the classroom with each new group of students. Thus, as previously stated, the solu-

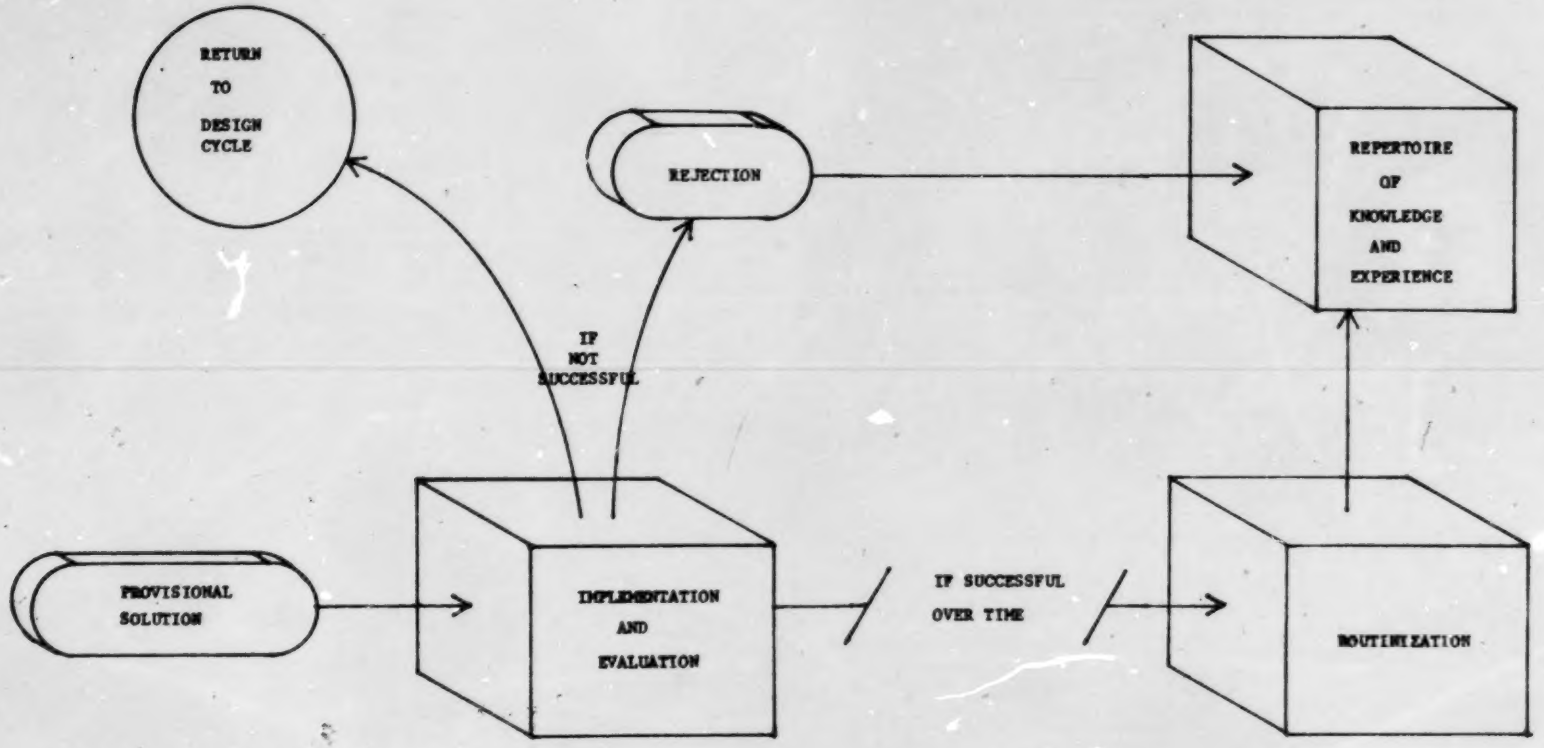


Figure 6: The implementation, evaluation, and routinization stage of teacher planning.

tions produced by the design cycle are only provisional. Indeed, regardless of a teacher's previous experiences, implementation often yields unexpected and surprising outcomes.

During or after implementation, activities are evaluated. In the classroom observed in this study, activities were usually tried out for several days, and sometimes several weeks, before a final judgment about their effectiveness was made; the teacher did not accept, reject, or modify an activity on the basis of one day's results. She explained that children of this age need several days to adjust and adapt to changes or new situations. According to the teacher, early problems with activities (especially when the focus was on involvement, interest, and enthusiasm) usually ironed themselves out as the students became familiar with the activities. The teacher took this same attitude with new weekly schedules, making modifications only at the end of a two- or three-week adjustment period at the beginning of a term.

Changes in unworkable activities were usually made along these lines; if the activity needed slight revision but was otherwise successful, the teacher made modifications. Modification might only have been a brief review via the design process, focusing on the deficient element or feature. (In the model this process is represented by an arrow looping back to the design cycle, where the problem is formulated, elaborated, and mentally investigated until a feasible solution is reached.) The revision was then fed back to the next activity session.

In the case of rejection, the whole activity is thrown out as unworkable. The decision to reject is usually made after deficiencies have been unsuccessfully redesigned or when the difficulties affect features that cannot be modified. For the teacher in this study, rejection was a rare occurrence. This was probably due to the amount of experience on which her

planning was based and the efficiency and effectiveness of the design cycle in weeding out problems.

Many successful activities are further changed by the process of routinization. More accurately, they go through a process of being "unchanged", that is, their elements and features become so established that they become routine. As mentioned earlier, routinization in this study functioned to lessen the planning burden on the teacher by reducing the number of activities or activity features she needed to plan on a regular basis. Because of this, most of her planning during winter and spring terms was devoted to social studies, science, and math unit planning -- activities for which she had chosen to devote more time -- and to activities such as field trips and cooking, for which routinization was not feasible.

In the planning model, routines established in the classroom become part of the teacher's repertoire of knowledge and experience, illustrating an important link between current teaching and future planning. As activities take on a routine character in the classroom, they may also take on a routine character in memory. Chase and Simon (1973) suggest that the bulk of a chessmaster's experience is represented by tens of thousands of visual patterns of chess moves stored in memory. They say that as a "new" configuration is encountered on the board, it calls up the same pattern from memory, along with the accompanying solution methods and strategies. It may be that experience in teaching also consists of a repertoire of memorized routines that are called up (immediately abstracted) by specific planning and teaching situations. These routines may then be implemented wholly or in part as solutions (elaborations) for particular planning problems. Thus, routinization of activities or strategies not only serves an immediate purpose of reducing the planning load, but also provides constructs in memory to simplify

and improve future planning.

## Discussion

In general, the descriptive findings of this study seem consistent with those of previous studies of teacher planning. Zahorik (Note 3) in a study of 12 teachers, found that the kind of planning decision reported most frequently concerned pupil activities; he also discovered that decisions about content were most frequently reported first. Similar findings were reported by Peterson et al. (Note 4). The teachers they observed devoted the largest proportion of their planning time to making decisions about content (subject matter), followed by decisions about instructional processes (strategies and activities). Like Zahorik, they found decisions regarding objectives conspicuously absent. Zahork found half of his sample reporting decisions about objectives; Peterson et al. observed that only the smallest proportion of their sample's time (.04%) was spent on objectives, even though a suggested list of objectives had been provided to the teachers beforehand.

Similarly, the most prominent and frequent planning concern of the teacher in this study was activities. However, the distinctions among activities, content, and materials made by Zahorik and by Peterson et al. were not apparent in this teacher's planning. Content and materials were subsumed under activities as features that helped define the activity; thus, activities did not exist apart from some subject matter. Part of this difference, however, may result from different definitions of "activity." Zahorik and Peterson et al. defined activities in terms of instructional process or strategy; this definition was quite close to the teacher instructional move feature that was a part of this study. In other words, the notion of an activity used in the present study was much broader than those used previously

and included features that had previously been treated as independent decisions. It may be that the notion of instructional activity developed here can provide a more useful framework for relating the various planning judgments and subproblems.

Perhaps the predominance of content as a planning focus found in earlier studies can be explained by the notion of routinization. Even in a highly routinized classroom such as the one in this study, "content and materials" was the feature of activities most frequently left "open", hence requiring planning at the weekly level. Content and materials could thus be viewed as the most frequent subproblem that this teacher had to deal with on a regular basis. Decisions about content and materials should be even more frequent for teachers with less routinized teaching. Except for the most highly routinized activities such decisions should always be present.

As in the Zahorik and Peterson et al. studies, behavioral objectives were not a central part of teacher planning in this study. District objectives for each subject matter area were the objectives most often confronting the teacher, and she used these as a guide or framework for deciding on activities. There was little evidence in this teacher's planning to support the rational choice model of planning. Based on these findings, planning was portrayed here as a purposeful activity guided by teaching goal conceptions and the specific problem conceptions; no provision was made for planning based on behavioral objectives or prior stated instructional goals.

The results of this study are also consistent with those reported by Morine (Note 5). She found that most of the plans submitted by the teachers she studied were moderately specific outlines listing possible examples or questions that might be used in the lesson. The outline form was also pop-

ular with the teacher in this study; however, at no level in her planning did she write down specific examples or possible questions. This is consistent with the follow-up notes or comments made by about two-thirds of Morine's teachers that the written plans they submitted for the two experimental lessons were much more detailed than usual and that most of their regular planning was done in their heads.

Morine also found that when goals were stated by teachers, they were non-behavioral goals. The teachers she studied not only selected from the goals provided them, but also tended to restate and develop original goals. Again, this non-behavioral orientation of goals and the tendency to modify goals to better suit one's purpose was also characteristic of planning in this study.

The teachers in Morine's study paid almost no attention to evaluation procedures and to pupil background characteristics. Lack of visible attention to evaluation procedures was also apparent in the study presented here; this seemed to be due to the built-in nature of the teacher's evaluation procedures. Written work was routinely evaluated and marked throughout the day, and student progress in tasks not regularly resulting in written products (e.g., reading) was monitored through regularly scheduled contact with the students. Hence, special evaluation features were rarely included in activities, and the teacher's plans revealed little or no concern for evaluation.

Attention to pupil background characteristics, on the other hand, was evident in this teacher's planning -- not in the plans themselves, but in the planning process. Pupil characteristics were an important source of information at all levels of planning. In terms of the process model, pupil characteristics formed an important part of her knowledge and experience

and played a role in both problem finding and the design process. Thus, although pupil characteristics are not necessarily apparent in the product, they are used to guide the process of planning.

Pupil characteristics and other factors influencing planning might be more visible if plans included several well-developed alternatives for action. The choice among alternatives might then be based on the presence or absence of certain aspects of the environment. However, in both Morine's study and this one, alternatives were rarely, if ever, mentioned in the final plan. Most of Morine's teacher subjects later indicated during interviews that they had thought of alternatives during their planning; but only a few mentioned alternative activities, leading one to assume that most of those alternatives were simply "variations on a theme."

This absence of alternatives from teaching plans influenced the form of the process model proposed earlier. A major feature of the design process is that only one planning problem is pursued at a time and only one solution is produced by the process. Alternatives might be considered as subproblem elaborations, but they will eventually either be rejected or incorporated into the total problem conception. Morine's finding that materials and cognitive considerations ("content") were reported most frequently suggests that these two aspects are essential subproblems taken up during the design process. Had Morine's teachers been following a rational choice model of planning, one would have expected a much higher frequency of alternatives reported in the plans. Although the focus of Morine's study was not process description, it can be inferred from the planning products and the teachers' responses that few, if any, of the teachers were following the rational choice planning model.

To date, no other studies have actually focused on the teacher planning process. In the three studies just discussed, process can only be inferred from products of planning or time spent in various planning endeavors. Studies of planning outside of education have little more to offer. Case studies of national or city planning, for example, have revealed only that there is little evidence to support the rational choice model. Alternative theories have thus been proposed but not empirically tested. Individual planning has been systematically investigated only in the area of architectural planning, and then only recently.

It is obvious from this discussion that research on teacher planning is in its infancy. Further research is needed in this area to test the results of this investigation and the models that have been proposed.

The model portrayed in Figure 7 may be one way to illustrate and coordinate for further research the components of the planning process that have been described or proposed in this study. The cube, which represents the research "space," is a combination of three dimensions of the planning process represented in this study: (1) the five levels of planning represented in the structural model, (2) the three stages of the process model, and (3) the cognitive components involved in planning represented by Simon's (1957) three phases of decision making -- intelligence, design, and choice. Intelligence refers to those processes by which one scans the environment to see what matters require decision. Here, it includes the perceptual and search processes of planning. Design includes the memory, generation, combination, and manipulation processes. Choice refers to processes for choosing among courses of action, such as judgment and decision making.

Future planning studies might focus on certain cells or slices of the model. For instance, one might investigate choice in problem finding at the

yearly level of planning, or one might study problem finding in general across all five levels. One might also, for example, choose to study unit planning in general or select a certain planning stage or cognitive component. As studies are completed, the model will provide a framework for coordinating the results and indicating processes not yet investigated. It is also likely that future studies will modify the research space by adding or deleting various cells as the planning characteristics of many teachers are described.

To conclude, the secondary goal of this study -- to formulate questions for further research through the generation of hypotheses and models -- has been achieved to an unexpected degree. The complex tapestry of planning and teaching (which has been only partially represented here) has revealed many new ideas and questions that need to be investigated. This study has also helped dispel notions that teaching is a fairly simple, straightforward enterprise by revealing the intricacies of the teaching environment and the variety of cognitive skills brought to bear by the experienced practitioner. This, in turn, further supports the claim that research on teaching must continue to examine the "wisdom of the practitioner" as that wisdom develops and functions during teaching in real classrooms.

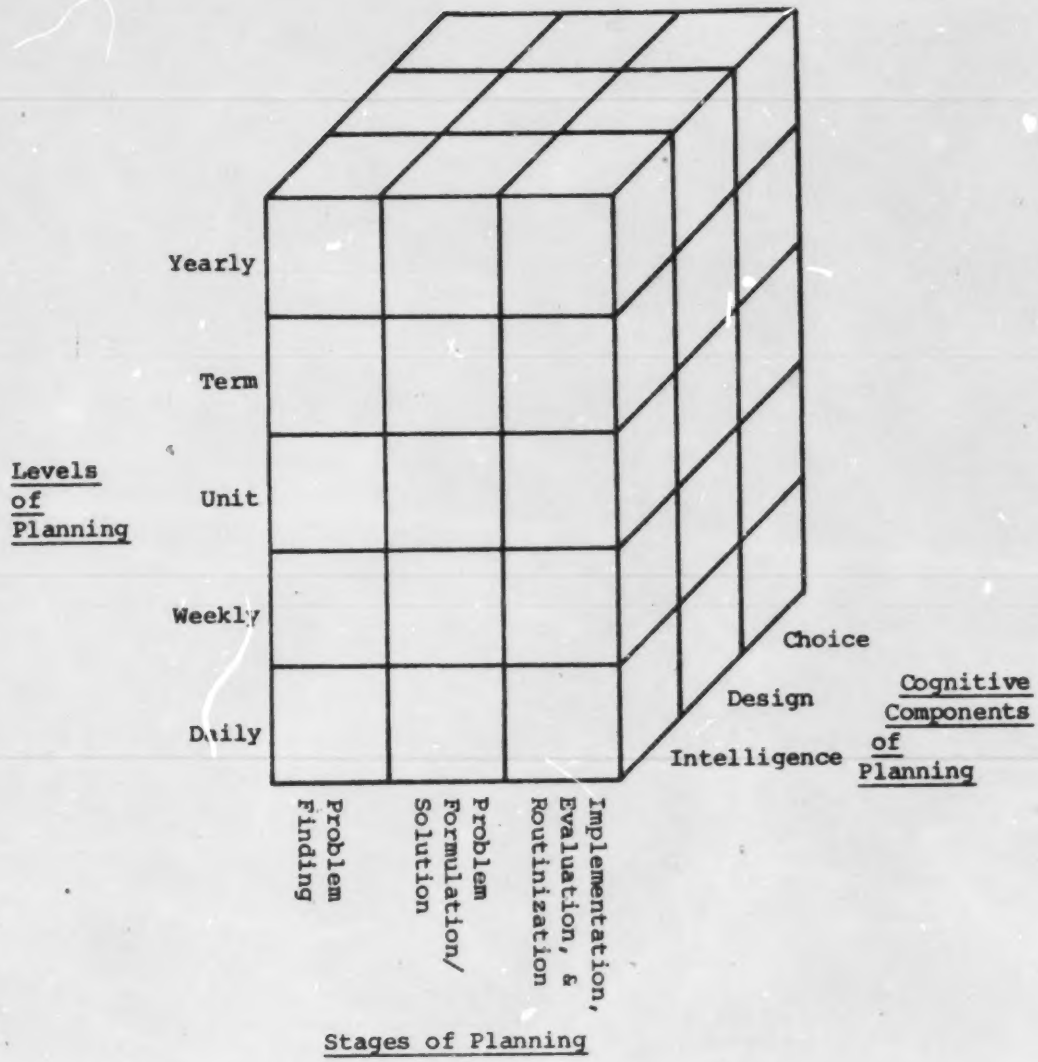


Figure 7: A model for Planning research

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